WHAT IS CLAIMED IS:

1. An alignment sensor, comprises:

means for generating interferometric first and second images of a symmetrical alignment mark having a center, the first and second images being rotated with respect to each other;

a first means for detecting the first image from the means for generating; and

a second means for detecting the second image from the means for generating;

means for analyzing output signals from the first and second means for detecting to determine a location of the center of the alignment mark.

2. The alignment sensor of claim 1, further comprising:

an illumination source having at least three different wavelengths, said illumination source providing coherent illumination to the alignment mark.

3. The alignment sensor of claim 1, further comprising:

an illumination source providing spatially coherent collimated electromagnetic radiation with a wavefront perpendicular to the alignment axis of the alignment sensor to the alignment mark.

4. The alignment sensor of claim 1, wherein:

said image rotation interferometer comprises glass prisms.

5. The alignment sensor of claim 4, wherein:

the glass prisms comprises two prisms joined at a beamsplitter surface.

6. The alignment sensor of claim 1, wherein:

said image rotation interferometer provides amplitude interference.

7. The alignment sensor of claim 1, wherein:

said image rotation interferometer provides polarization state interference.